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10/645,426	08/21/2003	Michael Seul	LEAPS-C11	8876

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EXAMINER	
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ART UNIT	PAPER NUMBER
1641	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/645,426	SEUL, MICHAEL	
	Examiner	Art Unit	
	Pensee T. Do	1641	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *23 May 2008*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *76-79,81-86 and 88-115* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *76-79,81-86 and 88-115* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☒ Interview Summary (PTO-413) Paper No(s)/Mail Date. *4/2/08* .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Amendment Entry & Claims Status

The amendment filed on May 23, 2008 has been acknowledged and entered.

Claims 76-79, 81-86, 88-96 and newly added 97-115 are being examined.

Withdrawn Rejection(s)

Rejections under 112, 1st and 2nd paragraph in the previous office action are withdrawn herein.

Rejections under 103 in the previous office action are withdrawn herein.

New Grounds of Rejection(s)

Claim Rejections - 35 USC § 112

The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claims 76-79, 81-86, 88-96 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

Independent claim 76 recites that “the particles are affixed to the substrate in a loosely packed, ordered array”. However, the specification fails to provide support for such limitation. The specification on [0009] discloses that "as a function of increasing applied voltage, beads first form planar aggregates in which particles are mobile and

loosely packed, then assume a tighter packing, and finally exhibit a spatial arrangement in a form of a crystalline, or ordered array resembling a raft of bubbles". This is interpreted as the beads go through three transformations: 1) mobile and loosely packed; 2) assume tighter packing; 3) spatial arrangement in an ordered array as the applied voltage increases. Therefore, the beads can either be loosely packed, or in an ordered array but never in both stages. However, claim 76 as now recited is interpreted as the beads are loosely packed and at the same time in an ordered array which the specification fails to support.

This is a new matter rejection.

The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 104 and 107 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 104 recites that the particles are fluorescently encoded which fails to further limit claim 97 because claim 97 recites in line 3 that "said particles are encoded with chemical characteristic which fluoresces".

Claim 107 recites "the optical label" which lacks proper antecedent basis.

Double Patenting

The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the “right to exclude” granted by a patent

and to prevent possible harassment by multiple assignees. A nonstatutory obviousness-type double patenting rejection is appropriate where the conflicting claims are not identical, but at least one examined application claim is not patentably distinct from the reference claim(s) because the examined application claim is either anticipated by, or would have been obvious over, the reference claim(s). See, e.g., *In re Berg*, 140 F.3d 1428, 46 USPQ2d 1226 (Fed. Cir. 1998); *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) or 1.321(d) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent either is shown to be commonly owned with this application, or claims an invention made as a result of activities undertaken within the scope of a joint research agreement.

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

Claims 76, 77, 79, 83, 86, 93, 95, 97, 99, 100, 102, 104, 107, 109, 114 are provisionally rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 114, 116, 117, 143, 144 of copending Application No. 11/436,718. Although the conflicting claims are not identical, they are not patentably distinct from each other because both set of claims are drawn to similar arrays.

The instant claims differs from the copending application ‘718 in that the instant claims are drawn to ligands and copending application ‘718 recite oligonucleotides. However, in the instant claims, ligands are defined in claims 79 as oligonucleotides. Because the claim sets are drawn to overlapping scope, the claim sets are not patentably distinct. The instant claims also differs in that it recites a “loosely packed, order array” whereas copending applications recite “ordered array”. However, it would

have been obvious to one of ordinary skills in the art that the particles in copending application '718 are loosely packed because each particle has oligonucleotides attached to the surface and thus the particles are not touching each other, in other words are loosely packed, because of the oligonucleotides on their surfaces.

This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

Claims 76, 77, 79, 83-86, 88, 91-97, 9, 100, 102-104, 106-115 are provisionally rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 114-142 of copending Application No. 11/436,009. Although the conflicting claims are not identical, they are not patentably distinct from each other because both sets of claims are drawn to an array of particles, and differ in the arrangement of limitations within each set of claims. For example, the instant claims are drawn to ligands where the ligands are defined in claims 79 as oligonucleotides. Because the claim sets are drawn to overlapping scope, the claim sets are not patentably distinct.

Copending application ‘009 differs from the present claims in that it fails to recite the particles in a loosely packed, ordered array. However, it recites that the particles comprises oligonucleotides on their surfaces and thus the beads are not touching each other or loosely packed because of the oligonucleotides in between the particles. Copending application '009 also recites in claim 122 that the beads are assembled in a predetermined geometry which can include an ordered array.

This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

Claims 76-79, 81-86, 88-115 are provisionally rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 20-46 of copending Application No. 10/310,173. Although the conflicting claims are not identical, they are not patentably distinct from each other because both sets of claims are drawn to similar arrays.

The copending application '173 differs from the instant claims in that it fails to recite a loosely packed, ordered array. However, it recites that the substrate have discrete sites at a predetermined density. Thus, it would have been obvious to one of ordinary skills in the art to interpret that the discrete sites is equivalent to loosely packed ordered array because if the discrete site contains a particle, then the particles when arranged in said substrate, are not touching each other or loosely packed and are in ordered.

This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

Claims 76-79, 81-86, 88-115 are provisionally rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 76-89, 109-115 of copending Application No. 11/436,717. Although the conflicting claims are not identical, they are not patentably distinct from each other because the claim sets

are drawn to similar arrays and differ only in arrangement of limitations. For example, the instant claims are drawn to ligands where the ligands are defined in claims 79 as oligonucleotides.

Copending application '717 differs from the instant claims in that it fails to recite the particles are loosely packed in an ordered array. Copending '717 recites that the particles are in designated positions in accordance with a given outline having multiple rows of particles.

Thus, it would have been obvious to one of ordinary skills in the art that when the particles in designated positions in accordance with a given outline, they are in an ordered array. Furthermore, they are also loosely packed because they have oligonucleotides in between them and thus are not touching each or are loosely packed.

This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

Claims 76-79, 81-86, 88-115 are provisionally rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 76-114 of copending Application No. 10/424,662. Although the conflicting claims are not identical, they are not patentably distinct from each other because the claim sets are drawn to similar arrays and differ only in arrangement of limitations. For example, the instant claims are drawn to ligands where the ligands are defined in claims 79 as oligonucleotides.

Copending application '662 differs from the instant claims in that it fails to recite the particles are loosely packed.

It would have been obvious to one of ordinary skills in the art that the particles in copending '662 are loosely packed because each particle has oligonucleotides attached to its surface and when these particles are arranged in an ordered array, there are always oligonucleotides in between them and thus they are not touching each other or are loosely packed.

This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 76, 77, 79, 83, 86, 89-93, 96, 97, 99-104, 107, 110-115 are rejected under 35 U.S.C. 102(b) as being anticipated by Drmanac (EP 0392546A2).

Drmanac teaches an array comprising different oligonucleotides attached to different or discrete particles (DNA fragments, col. 7, lines 5-14). The discrete particles are labeled with a unique combination of oligonucleotides so that the particles carrying the DNA can be distinguished and identified (col. 7, lines 4-58, col. 8, lines 1-17). Drmanac also teaches that the particles are mixed and spread in a random monolayer

onto a filter in a monolayer of required density followed by fixation (see col. 7, lines 29-33; col. 17, line 29) wherein the particles are anchored to a filter (substrate) (see col. 7, lines 29-30). Drmanac further teaches that the single hybridization area (HA) can be subdivided into "submatrices" (col. 9, line 40 to col. 20, line 1), in which the particles carry a physical or chemical entity which enables recognition of the particle type (col. 21, lines 9-27). The particles are attached to specific regions of the hybridization area and the exact position of each discrete particle in the HA can be established (see col. 19, line 40-col. 20, line 3). Thus, the particles are in an ordered array or matrix. Regarding "the particles are being fixed in a loosely packed array" or "the particles are not touching each other in an array", since the particle each contains DNA fragments which can be long in length, they must be separated by these DNA fragments and must not touch each other.

For claims 77, Drmanac teaches the particles are fixed to the substrate/filter (see col. 7, lines 29-33).

For claims 79, 83, 90, 99, and 100, Drmanac teaches the ligands are nucleic acids or oligonucleotides of DNA or RNA (see abstract).

For claims 86, 93, 104, 107, 114, Drmanac teaches that the hybridizing probe is attached to a fluorescent molecule (see col. 18, lines 17-22; col. 7, line 45-col. 8, line 17).

For claim 89, Drmanac teaches adding a liquid sample containing analytes to the particles. (see col. 7, lines 17-21).

For claims 91, 111, Drmanac teaches that the single hybridization area (HA) can be subdivided into "submatrices" (col. 9, line 40 to col. 20, line 1).

For claims 92, 112, Drmanac teaches that the location of each array on said substrate in combination with the chemical or physical characteristic indicates the types of ligands therein. (see col. 19, line 40-col. 20, line 3).

For claims 96 and 110, since these particles are in a matrix or an ordered array, the distance between these particles are the same.

For claims 101-103, 113-115, Drmanac teaches attaching oligonucleotide to the particles. (see col. 7, lines 10-13). Since binary encoding requires just the attachment of oligonucleotides to the particles, Drmanac satisfies such requirement.

Claims 76-79, 81-84, 86-115 are rejected under 35 U.S.C. 103(a) as being unpatentable over Margel in view of Singer et al. (5,573,909) and further in view of Gombinski (US 6,297,062).

Margel teaches a composition comprising: a) a substrate such as silicon wafer (silicon substrate of claims 84, semiconductor), glass (col. 4, lines 25-31, lines 60-61) in a planar array; b) a population of particles randomly distributed on said sites or wells, said population comprises a plurality of different types of particles with chemical or biochemical binding sites/ligands. (see col. 2, line 35-col. 3, line 5; col. 4, lines 25-65). Regarding claim 88, Margel teaches that immobilization is by chemical bonding or physical bonding. (see col. 3, lines 35-36). The ligands are protein/antibody and biological cells. (see col. 1, lines 40-45; col. 3, lines 23-27). Regarding claim 82, since

Margel teaches the use of antibody specific for T-lymphocytes, it is inherent that Margel teaches using monoclonal antibodies because monoclonal antibodies are specific for a cell type. Margel teaches that 1,300 picomoles per squared centimeter protein were bonded to each of the supported microsphere system (see col. 11, lines 7-9). For claim 95, Margel teaches that the average size of the microspheres range from 300 Angstrom to 8 microns which covers the range of 1 micron to 2 microns for claim 95.

However, Margel fails to teach each type of particle comprises a distinct chemical or biochemical binding site and comprises a unique chemical label; the biochemical binding site comprises a nucleic acid and particles are exposed to a sample containing target analyte. Margel also fails to teach the chemical tag is an oligonucleotide.

Singer teaches microparticles having detectably distinct spectral characteristics of a plurality of dyes incorporated into the microparticles that provide a large and effective Stokes shift, wherein in one example a microparticle-labeled probe emits green fluorescence and another microparticle-labeled probe emits red fluorescence, wherein each microparticle with a distinct spectral characteristic is labeled with a different target complement (biochemical binding sites) to bind with different targets in a sample (claim 89). (see col. 1, lines 32-34, col. 4, lines 37-67, col. 13, lines 53-56; col. 16, lines 54-65). Singer also teaches that the microspheres are polyacrolein or polystyrene and that the target and target complement are antibodies and proteins, respectively. (see col. 13, lines 60-63, col. 16, lines 3 and 31). Singer also teaches that a nucleic acid probe on the microparticles is selective for target nucleic acids. (see col. 14, lines 15-62, col. 16, lines 9-12, and 40-43; col. 18, lines 49-51). For claim 93, Singer teaches that the

microparticles are fluorescent and comprises an oligonucleotide. (see col. 26, lines 44-46). For claims 101-104, 113-115, since Singer teaches attaching oligonucleotides to microparticles, and the claims define binary encoding is to attach oligonucleotide to particles, Singer satisfies the requirement of binary encoding.

It would have been obvious to one of ordinary skills in the art to modify the composition of Margel with microparticles having distinct spectral characteristics of a plurality of dyes incorporated into the microparticles and each microparticle is labeled with a different target complement for detecting different target materials in a sample, and such target complement is a nucleic acid as taught by Singer, in order to detect one or more variety of target materials including nucleic acids simultaneously and with high sensitivity since both references teach polyacrolein and polystyrene particles that can immobilize antibodies.

However, Singer and Margel fail to teach the particles are in a loosely packed, order array or are not touching each other or an article of manufacture composition comprising two or more of any of the array defined in claims 76 to 90; and the location of the array on said substrate in combination with the chemical or physical characteristic indicates the types of ligands therein.

Gombinski teaches a matrix comprising of several arrays comprising particles positioned randomly on those array. (see fig. 2, col. 12, lines 15-31). Gombinski also teaches that the location of the array can be stained with a dye or a label so that it can be identified. (see col. 7, lines 16-20). Gombinski also teaches that the particles are in a loosely packed, ordered array , and the particles are not touching each other. (see fig.

1). Regarding claims 94 and 108, in another embodiment Gombinski teaches that the particles are closely packed in a hexagonal configuration (see figure 5).

It would have been obvious to one of ordinary skills in the art to produce several of arrays wherein the particles are loosely packed, not touching each other, in an ordered array or in a hexagonal configuration (closely packed) as taught by Margel and Singer as suggested by Gombinski to accommodate assays of different types of ligands and different samples for multiple screening. It is known that the particles can be affixed to a substrate to form a loosely packed or closely packed array/hexagonal configuration depending on the number of samples being screened. If there are many samples to be screened, then a closely packed configuration would be necessary. Otherwise, a loosely packed configuration is formed.

Claim 85 is rejected under 35 U.S.C. 103(a) as being unpatentable over Margel in view of Singer and further in view of Gombinski as applied to claim 76 above, and further in view of Nacamulli et al. (US 5,527,710).

Margel, Singer and Gombinski have been discussed above.

However, Margel, Singer and Gombinski fail to teach that the substrate is an electrode.

Nacamulli teaches antigen coated magnetic particles (particle-attached ligands) are deposited uniformly onto the working electrode from a flow stream by placing the magnet directly below. Electrochemiluminescent labeled antibodies are added and the

labeled antibodies to the antigens on the magnetic bead immobilized on the surface of the electrode. (see col. 3, lines 10-30).

It would have been obvious to one of ordinary skills in the art to use the electrode taught by Nacamulli as a substrate for use in the composition taught by Margel and Singer modified by Gombinski since Margel teaches that the population of particles can be immobilized on semiconductor substrate and Singer teaches that the particles are encoded with labels such as fluorescent labels which can be electrochemiluminescent labels and Nacmulli teaches that detection ECL labels requires as substrate such as an electrode because electrical pulses are needed to apply in order to modulate the ECL output. The ECL signals are useful in monitoring the rates of binding between the proteins/reactants as well as detecting a low concentration of sample.

Response to Arguments

Applicant's arguments with respect to claims 76-79, 81-86, 88-96 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Pensee T. Do whose telephone number is 571-272-0819. The examiner can normally be reached on Monday-Friday, 9-5.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mark Shibuya can be reached on 571-272-0806. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Christopher L. Chin/
Primary Examiner, Art Unit 1641

/Pensee T. Do/
Examiner, Art Unit 1641